CLAIMS

1) An induction sealing device which may be used for producing packages of pourable food products by transversely sealing a tube (13) of sheet packaging material comprising at least one layer (12) of induction-heatable material covered with plastic material (16), said sealing device comprising:

- generating means (3) for generating an alternating power signal **S(ω)**;

- at least one inductor (4) receiving the alternating power signal **S(ω)** to induce a parasitic electric current in said layer (12) and locally melt said plastic material (16) to form a transverse seal; and

- a matching circuit (7) for achieving optimum power transfer between said generating means (3) and said inductor (4);

characterized in that said matching circuit (7) comprises an inductive-capacitive circuit, in which at least one inductive element (23a; 23) is connected to at least one variable-capacitance capacitive element (20, 24, 25, 26, 27); the capacitance of the capacitive element being adjustable so that the current-voltage phase angle is close to zero.

2) A sealing device as claimed in Claim 1, wherein said inductive element (23) and said capacitive element (20, 24, 25, 26, 27) are parallel to each other.

3) A sealing device as claimed in Claim 1 or 2,

wherein said capacitive element (20, 24, 25, 26, 27) comprises at least one main capacitor (20), and a number of auxiliary capacitors (24, 25, 26, 27) selectively connectable/disconnectable parallel to said main capacitor (20).

4) A sealing device as claimed in Claim 3, wherein switching devices (24a, 25a, 26a, 27a) are connected to respective auxiliary capacitors (24, 25, 26, 27) to switch respective auxiliary capacitors (24, 25, 26, 27) on/off.

5) A sealing device as claimed in Claim 4, wherein each switching device (24a, 25a, 26a, 27a) comprises a first and a second IGBT transistor (40a, 40b) having emitters (E) connected to each other, and collectors (C) communicating respectively with an electric line (21) communicating with the main capacitor (20), and with an end terminal of a respective auxiliary capacitor (24-27); the gates (G) of said IGBT transistors (40a, 40b) being connected to each other, and receiving a voltage command V_{do} to turn said IGBT transistors (40a, 40b) on/off.

6) A sealing device as claimed in Claim 5, wherein at least one resistor (46) is interposed between the gates (G) and the emitters (E) of the IGBT transistors (40a, 40b); said resistor (46) ensuring discharge of the current stored in the internal capacitors of the IGBT transistors when these are off.

7) A sealing device as claimed in Claim 5, wherein at least one Zener diode (48) is interposed between the

gate (G) and the emitter (E) of each IGBT transistor (40a, 40b); said Zener diode (48) limiting the voltage V_{ge} of the IGBT transistor to a predetermined maximum value.

8) A sealing device as claimed in Claim 1, wherein said inductive element (23a; 23) has a variable inductance value; said inductance value being regulated so that the impedance of said matching circuit assumes a value close to an optimum impedance value Z_{ott}, e.g. of 50 ohms, to maximize power transfer from said generating means (3) to said inductor (4).

9) A sealing device as claimed in Claim 8, wherein said inductive element (23a; 23) comprises a transformer (23) having a primary winding (23a) with a number of inputs (50) associated with respective turns and so producing, when selected, different transformation ratios of the transformer (23).

10) An induction sealing method which may be used for producing packages of pourable food products by transversely sealing a tube (13) of sheet packaging material comprising at least one layer (12) of induction-heatable material covered with plastic material (16), said method comprising the steps of:

- generating (3) an alternating power signal $S(\omega)$ by means of a generator (3);

- supplying said alternating power signal $S(\omega)$ to at least one inductor (4) to induce a parasitic electric current in said layer (12) and locally melt said plastic

material (16) to form a transverse seal; and

- optimizing power transfer between said generator (3) and said inductor (4) by means of a matching circuit (7);

characterized in that said optimizing step comprises the step of adjusting the capacitance of at least one capacitive element (20, 24, 25, 26, 27) connected to at least one inductive element (23a, 23) so that the current-voltage phase angle is close to zero.

11) A sealing method as claimed in Claim 10, and comprising the step of regulating the inductance value of said inductive element so that the impedance seen by said generator assumes a value close to an optimum impedance value Z_{ott}, e.g. of 50 ohms, to maximize power transfer from said generator (3) to said inductor (4).